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Reacquisition of Skills by Combat Engineers Mobilized From the Individual Ready Reserve

Robert A. Wisher, Richard P. Kern, Mark A. Sabol, and Beatrice J. Farr
U.S. Army Research Institute

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For this report, skill reacquisition data were collected during a mobilization training exercise on 76 individual ready reserve (IRR) soldiers (combat engineers) who had been separated from active duty for periods ranging up to 10 years. Military occupational knowledge was measured before and after a 5-day rapid train-up and hands-on performance for 18 MOS tasks was recorded. Increases in task knowledge were strongly related to prior active duty status (full tour vs. initial entry training only) and Armed Forces Qualification Test (AFQT) scores (above vs. below the 50th percentile). Time since separation from active duty did not have a systematic effect. Although these findings cannot be generalized beyond the procedural-type skills examined, the results are evidence for a need to reconsider the current IRR mobilization guideline based solely on separation time. These findings suggest that active duty status, AFQT scores, and a separation window as long as 36 months can serve as determinants of potential for rapid reacquisition of critical skills during a mobilization.

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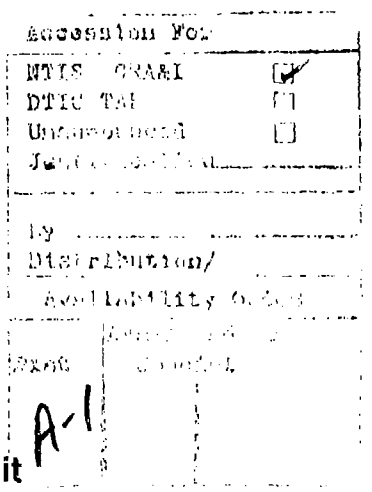

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FOREWORD

To ensure that the U.S. Army's soldiers acquire the skills and knowledge necessary to perform their jobs successfully, the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) performs behavioral research on skill acquisition. Such research becomes especially relevant during a partial or full mobilization in which members of the Individual Ready Reserve (IRR) are recalled. Because they represent a pretrained military asset, their reacquisition of skills is critical for the Army's response to a crisis.

This report details the findings of skill reacquisition by IRR combat engineers during a mobilization training exercise held at Fort Leonard Wood. It suggests that the period of time that a soldier is separated from active or reserve duty is not the most critical factor in determining skill reacquisition. These findings can have important implications for mobilization policy. They have been briefed to the Assistant Deputy Chief of Staff for Personnel, the Deputy Chief of Army Reserve, the Director of Army Training, and the Training and Doctrine Command.

EDGAR M. JOHNSON
Director

ACKNOWLEDGMENTS

We wish to express our appreciation for the support and the coordinating actions that enabled us to integrate this research into the much larger Call Forward 93 (CF93) mobilization exercise. Specifically, we extend our thanks to COL Alan Sepe, Director, Mobilization Directorate, Office of the Deputy Chief of Staff for Personnel, and John Henderson, Plans and Execution Division, Training and Doctrine Command, for encouraging and supporting the insertion of our research into CF93. Coordination and scheduling required to accomplish a seamless integration of this research was made possible by staff of the 98th Division (Training) and the U.S. Army Engineer Center, Fort Leonard Wood. Specifically, we wish to thank Michael J. Nixon, Operations/Training, 98th Division, Lieutenant Colonel McCully, 3rd Training Brigade and 98th Division, and Major Nobles and Herb Hiatt, Directorate Plans, Training, and Mobilization, Fort Leonard Wood.

We also wish to thank the staff of the U.S. Army Reserve Personnel Center for obtaining demographic and other information needed to analyze the data collected. Specifically, we thank Anthony Wood, Program Analysis and Evaluation Office, for his assistance in identifying and obtaining personnel information needed to accomplish the data analysis.

And finally, we wish to gratefully acknowledge the spirited and professional assistance provided Michael Eidelkind, David Varnell, and Christine DiMarino, Consortium Research Fellows to the U.S. Army Research Institute for the Behavioral and Social Sciences, and LTC David Mott, IMA, U.S. Army Reserve.

REACQUISITION OF SKILLS BY COMBAT ENGINEERS MOBILIZED FROM THE INDIVIDUAL READY RESERVE

EXECUTIVE SUMMARY

Requirement:

The Department of the Army, Assistant Deputy Chief of Staff for Personnel tasked the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) to develop a continuing program of study on the question of skill decay and reacquisition. This tasking stemmed from an interest in extending the knowledge gained during Operation Desert Storm, in which ARI investigated skill decay, rapid train-up, and the attitudes, motivations, and concerns of those mobilized from the Individual Ready Reserve (IRR).

Procedure:

Skill reacquisition data were collected on 126 IRR volunteers (99 combat engineers and 27 carpentry and masonry specialists) who had been separated from active duty for periods ranging from 7 months to over 10 years. The data collection was tied into Call Forward 93 (CF93), a mobilization training exercise conducted at Fort Leonard Wood from May to July 1993. MOS school knowledge tests developed for these two MOS were given before and after a 5-day rapid train-up program. Hands-on testing of various MOS tasks occurred immediately after the training for each task, and performance was recorded in specially designed evaluation booklets.

Findings:

Due to the larger sample, the principal statistical analyses focused on skill reacquisition by the combat engineers. In analyzing the variability in performance on the knowledge tests (where a score of $\geq$70% was considered "proficient"), a distinct pattern emerged, which was generally supported by a similar pattern in the hands-on testing:

a. Soldiers with full, prior-service tours were more likely to achieve knowledge proficiency from the rapid train-up (75% proficient) than soldiers whose prior active duty was only entry-level MOS training (53% proficient). However, for both groups, members who had Armed Forces Qualification Test (AFQT) scores at or above the 50th percentile had a greater likelihood of achieving knowledge proficiency (93% proficient) after the rapid train up than members having lower AFQT scores (47% proficient).

b. AFQT scores were strongly related to quality of performance on the hands-on tests for the group who had been on active duty only for initial entry training. In this group, members above the AFQT median averaged 90% pure Go (errorless, no instructor prompting) while members below the AFQT median averaged only 75% pure Go. AFQT scores for the group who had full, prior-service tours showed no relationship with quality of hands-on performance.

c. Time elapsed since active duty (categorized into three periods: 24 months or less, 25 to 48 months, and over 48 months) did not have a systematic effect on pretest School Knowledge scores or affect gains in proficiency resulting from training. Quality of performance on hands-on tests resulting from the training was also not affected by time elapsed since active duty.

Utilization of Findings:

Although these findings cannot be generalized beyond the procedural-type skills examined, the results are evidence for a reconsideration of the current IRR mobilization guideline that is based solely on separation time, namely those out less than a year are called back first. The guideline needs to be re-evaluated to consider active duty status, AFQT score, and up to 36 months of separation as the key determinants of potential for rapid reacquisition of critical skills.

REACQUISITION OF SKILLS BY COMBAT ENGINEERS MOBILIZED FROM THE INDIVIDUAL READY RESERVE

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REACQUISITION OF SKILLS BY COMBAT ENGINEERS MOBILIZED FROM THE INDIVIDUAL READY RESERVE

Introduction

Upon declaration of a partial or full mobilization, members of the Individual Ready Reserve (IRR) are ordered to active duty as individual replacements. Because IRR soldiers represent pretrained military manpower, their return to active duty serves to expand and enhance the capacity of the Army to respond quickly to a crisis or natural disaster. However, their time out of active duty may have resulted in substantial decay of critical military skills and a consequent need for concentrated training. Enabling individuals and units to regain mission-capable status in the shortest possible time thus becomes a pressing objective during any mobilization.

Research by the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) during Operation Desert Storm led to important insights into how best to reach this objective (see Wisher, Sabol, Sukenik & Kern, 1991; Terry, Evans, Heller & Smith, 1991; Steinberg, 1991; Evans, 1992; Terry, Smith & Heller, 1993). In order to build upon that work, the Department of the Army, Assistant Deputy Chief of Staff for Personnel (ADCSPER) tasked ARI to develop a continuing program of study on the question of skill decay and reacquisition. Within the office of the DCSPER, the Mobilization Directorate took the lead in defining the tasking, which led to a particular emphasis on the question of skill reacquisition. This report documents ARI's investigation of skill and knowledge reacquisition in the context of a mobilization training exercise conducted from May through July 1993.

Background

If personnel variables can predict who can and who cannot reacquire skills in the abbreviated training period demanded during a mobilization, there is an opportunity to optimize training. Training schedules might be prioritized to ensure that certain soldiers are trained and ready for deployment in as short a time as practical. Other soldiers likely to require additional training time could be batched through a longer train-up. Those predicted to struggle with reacquisition in their original military occupational specialty (MOS) could become candidates for cross-training in a shortage MOS. Since the new training of these individuals would be extensive anyway, there may be a better payoff from training them in a different MOS in greater need of soldiers. (Such was the case with many soldiers cross-trained as truck drivers during Operation Desert Storm.) In this way, a training advantage might be taken of both the strengths and weaknesses of the IRR pool.

A key question, then, for the mobilization planner is, "How much training is needed by an IRR soldier to relearn lost or rusty skills?" A corollary to this question asks whether there are relationships between skill reacquisition times and personnel variables such as aptitude test scores and time out of service. Answers to these questions could help planners formulate a more

effective, targeted response to future mobilization needs in terms of personnel selection, training-resource allocation, and more accurate prediction of expected time to deploy.

In the event of a mobilization, current training plans by the Training and Doctrine Command (TRADOC) for the IRR call for three levels of training: a Rapid Train-Up Program (RTUP) averaging about two weeks; an IRR Refresher training course of about four weeks in duration; and an IRR Reclassification course which uses the existing Advanced Individual Training courses and can be several months in duration (TRADOC, 1992). The assignment of IRR soldiers to these courses is based solely on RT (recently trained) time, with the RT-12/18 (corresponding to up to 12 or 18 months since separation from active duty or from a National Guard or Army Reserve Unit) slotted for the RTUP course, and others for the refresher or reclassification courses for shortage MOS. The only personnel variable considered, then, is "RT" time.

Current mobilization guidelines endorse calling up first those in the RT12 category within the IRR, that is, those who have been separated from either active or reserve units for periods not more than 12 months. A recent example illustrates this approach. During Operation Desert Storm, the partial mobilization called up RT12s from 160 different specialties. Although never executed, further plans would have extended the call-up first to RT18s and then to RT24s. Thus, the basic strategy was to satisfy manpower requirements by recalling those most recently separated and to extend the recall by six-month increments as needed.

Separation time was the only factor considered. It is possible, of course, that issues other than skill decay and reacquisition are involved here; for example, readjustment to Army life may become more difficult as separation time increases, due to problems in such matters as discipline and physical fitness. Nevertheless, the current guideline seems based, ultimately, on an assumption that the use of longer separation intervals increases the time needed to provide trained soldiers to the area of operation. Otherwise, the same manpower requirement could have been satisfied in other ways, such as recalling all RT24s with higher aptitudes. Furthermore, the use of smaller time increments after the first 12 months suggests that retraining time was expected to increase as separation time lengthened beyond 12 months.

The current guideline thus seems to assume that time since separation is the largest single factor predicting skill reacquisition. Separation time is, indeed, known to affect skill decay (Hagman & Rose, 1983); the observed decay function for most skills has its steepest drop at the beginning of the period of nonuse and successively smaller drops thereafter. However, the relationship between extent of skill decay and difficulty in skill reacquisition has not yet been established empirically. The intuitively appealing assumption is that time needed to reacquire a skill which has decayed during a period of nonuse is a direct function of the degree of decay. That is, skills suffering moderate decay over short periods of nonuse are assumed to be easily reacquired, while skills much decayed after long periods of nonuse will be proportionately harder to reacquire. There is, however, little empirical evidence to either support or deny this assumption. To elaborate on these issues, we turn now to a brief review of the research on such aspects of decay and relearning.

Research on Skill Decay and Reacquisition

Since the first systematic study by Ebbinghaus in 1885, skill and knowledge decay has been widely studied in the context of military training (see Rowatt & Schlecter, 1993, for a recent review). These studies agree that (except for motor skills) the decay curve shows its greatest loss early in the period of nonuse. Such skill decay has already been demonstrated within the IRR; in Wisher et al. (1991), we found that our sample drawn from the 20,000 IRR soldiers called up for duty during Operation Desert Storm exhibited the typical pattern of skill and knowledge decay described above. We also showed that soldiers' scores on Skill Qualification Tests (SQT) and the Armed Forces Qualification Test (AFQT) were significant predictors of the soldiers' susceptibility to such decay. Such findings imply that some individuals will be better able to regain proficiency from a rapid train-up program than will others. Measures of aptitude, therefore, need to be considered in any attempt to predict soldiers' skill decay.

Other research has explored the relationship between job knowledge and skill decay. Wisher and Sabol (1990) found that soldiers' demonstrated understanding of the workings of a communications network was a significant predictor of their retention of complex procedural skills needed to operate that network. On the basis of this research, we take the view that reacquired proficiency for soldiers in the IRR should be revealed both in their skill at task performance and in some demonstrable measure of their job knowledge. This underlying knowledge would help sustain task proficiency from the time of reacquisition to the time of application weeks or even months later.

Recent research (Semb, Ellis & Anaujo, 1993) has shown that, contrary to popular belief, knowledge imparted in the classroom is retained well for periods up to several years. In our view, such long-retained job knowledge can provide reference points around which a skill may be reconstructed when required. Without such points of reference, the single performance of a task by a soldier during a rapid train-up cannot be taken to demonstrate a reacquired skill. It may merely represent a short-term memory, in which the soldier immediately imitates the instructor's behavior; minutes later, the "skill" may have evaporated, unless it is pegged to an internal knowledge structure. We, therefore, feel that it is important to measure both job knowledge and hands-on performance in assessing proficiency.

A related variable known to influence decay and reacquisition is "overlearning," training beyond the point where the learner first performs successfully. Research has demonstrated that overlearning can lead to slower decay (Farr, 1987; Wells & Hagman, 1989; Rowatt & Schlecter, 1993). This effect has direct relevance to skills within the IRR, because of the wide variability in extent of training and depth of experience among IRR soldiers. Although the majority of soldiers enter the IRR when they have completed their active duty contracts but have time remaining in their military service obligation, entry is possible through various circumstances, such as the deactivation of a soldier's reserve unit. Thus, while most IRR soldiers have had prior service (i.e., have completed at least one full tour of active duty), many have not.

Soldiers who have completed a tour of active duty are more likely to have overlearned their MOS skills, through increased opportunities for practice while on active duty tours. These soldiers should be more likely to retain their skills and knowledge than are soldiers with less practice. A central issue, then, is whether the prior service, full-tour soldiers require a shorter time to reacquire skills that have grown rusty when compared to reserve component soldiers who, after completing their MOS training, did not serve on active duty and presumably have not overlearned their MOS skills. There might be advantages to focusing the training resources of a call-up on the prior service, full-tour soldiers.

While in the IRR, soldiers may re-enlist when their military service obligation is completed and thus extend their time in the IRR for many years. In effect, this prolongs the interval of nonuse to lengthy periods that can exceed ten years. Another important question for mobilization planners, then, is how long a period of separation is tolerable before the rapid train-up becomes largely ineffective. As previously discussed, prior guidelines have initially set this at 12 months (RT12), but with little research evidence in support. The issue of how long a separation may be before the value of rapid train-up diminishes is addressed in the current report. That is, the time a soldier has been separated from active duty will be tracked, along with soldier aptitude and length of active duty, as a possible predictor of skill decay and reacquisition.

Although they will not be examined here empirically, two other factors deserve mention as possible predictors: skill type and a soldier's civilian occupation. Skill type refers to the category of skill being reacquired, and these can range from simple perceptual-motor skills, such as weapon qualification, to the complex decision-making involved in target acquisition in an air defense system. Civilian occupation refers to the job, educational, and avocational activities of the IRR soldier during the period of separation. If, for example, a soldier had been trained as a medic (MOS 91B) in the Army and then worked in an emergency medical services job since leaving active duty, the occupational activities while a civilian would mitigate the decay of MOS skills and perhaps influence reacquisition time.

However, the present report focuses on the skills of a Combat Engineer; with a few task exceptions, these skills have little correspondence to those of any civilian occupation. This factor--high or low correspondence to civilian occupation--could not, therefore, be investigated at this time. Also, since skill type was necessarily limited to the step-by-step procedural skills prevalent in Combat Engineer training, this factor--two or more different skill types--could not be investigated. (It is worth noting, however, that step-by-step procedural skill is a type of skill commonplace in Skill Level 1 tasks.) While they could not be examined here, these variables--skill type and civilian occupation--are clearly important and might be investigated in future research.

In summary, the following variables in the research literature have been identified as candidate variables for predicting skill reacquisition: 1) length of active duty service, 2) time since separation from active duty, and 3) aptitude, as measured by such tests as the AFQT. The effects of these variables are examined in the current research.

In conducting any research on military training, an indispensable requirement is that the research setting emulate closely the military training environment to which the findings will be generalized. The best environment for IRR skill reacquisition research is one in which IRR soldiers are recalled and trained under the same conditions, to the same standards, and by the same instructors as would be done in an actual mobilization. Such an opportunity was available during the mobilization exercise described below.

CALL FORWARD 93

CALL FORWARD 93 (CF93) was the second in a series of DA-Directed Exercises conducted in order to surge a mobilization station with reserve component units as a means of evaluating that installation's mobilization plans, policies, procedures, systems, and organization. Between May and June 1993, CF93 surged Fort Leonard Wood, Missouri, a TRADOC installation designated as a mobilization station. In addition to the 29 reserve component units with a total of 971 personnel, 126 IRR soldiers were voluntarily mobilized as part of the exercise. Two MOSs were examined in CF93: MOS 12B, Combat Engineer (n = 99), and MOS 51B, Carpentry and Masonry Specialist (n = 27).

Since CF93 was designed to "fix issues" from Operation Desert Storm, it encompassed the complete mobilization station sequence of (1) in-processing by a Reception Battalion, (2) the rapid train-up program of instruction, and (3) soldier readiness processing by a Personnel Replacement Battalion. All this was executed in a manner that paralleled an actual mobilization. A timeline of activities for the IRR portion of the exercise is presented below in Figure 1.

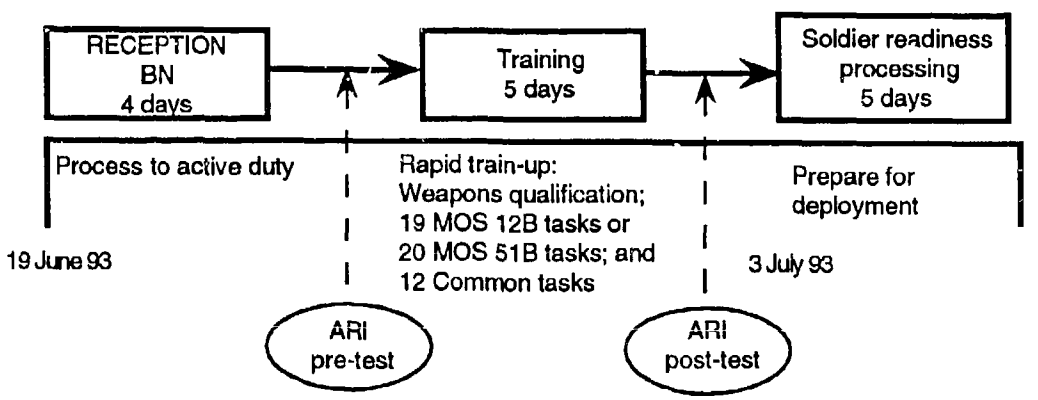

Figure 1. Timeline of IRR activities during CALL FORWARD 93

The CF93 Rapid Train-Up Programs

As part of the Army's overall mobilization planning, Rapid Train-Up Programs of Instruction (RTU POI) have already been developed, by the U.S. Army Engineer School, for IRR soldiers previously trained in MOS 12B and 51B.

Combat Engineers. For CF93, the Engineer School abridged the RTU POI for the combat engineers to conform to the five days available for training. The full RTUP for this MOS contains 31 tasks. Time and equipment constraints during CF93 reduced that number to the 18 tasks listed below in Table 1. The list of tasks in the full RTU POI is compared with those trained in CF93 in Table A1, Appendix A.

Table 1.

Rapid Train-Up Program of Instruction (POI) for Combat Engineers

Task Title	CF 93 Scheduled Hours
Tie Knots and Lashings	3.0
Prepare a Simple Tackle System	1.5
Install Pickets, Barbed Wire Ties & Install Concertina	1.0
Assist in Assembly of Double-Single Bailey Bridge	4.0
Perform Operator/Crew Preventive Maintenance Checks	4.0
Construct a Nonelectric Initiating/Detonating Assembly Prime Explosives Nonelectrically Construct an Electric Initiating/Detonating Assembly Prime Explosives Electrically Prime Explosives with Demo Cord Install a Dual Firing System	5.0
Install/Remove M14 Antipersonnel Mine Install/Remove M16A1 Antipersonnel Mine Install/Remove M15 Antitank Mine Install/Remove M19 Antitank Mine Install/Remove M21 Antitank Mine Install/Remove US Antihandling Devices on Antitank Mns. Locate Mines Using the AN/PSS-11 Mine Detector	7.0
Engineer Hand Tools (not in the RTU POI)	1.0
Total, MOS 12B, Skill Level 1 Specific Tasks	27.0 hours

Carpentry and Masonry Specialist. Analyses of skill reacquisition data for MOS 51B are not presented in this report due to inadequate testing conditions and the small sample. Hands-on performance tasks were conducted as Practical Exercises with the emphasis upon training rather than testing. Thus, the test data available do not reflect the proficiency of individual soldiers. Tasks in the RTU POI, tasks trained during CF93, demographic data, and school knowledge pre and posttest scores are presented in Appendix B.

Conduct of CF93 Rapid Train-Up

Training of the IRR soldiers was conducted by a detachment of Reserve Unit Combat Engineers from the Training Support Brigade of the 98th Division (Training) from Buffalo, New York. This unit serves as part of the training base expansion for Fort Leonard Wood during mobilization. Participation in CF93 served as their annual training. Additional instructor support for some tasks was provided by active duty instructors who regularly train those tasks.

As shown in Figure 1, five days were devoted to training. A training day extended from wake-up at 0430 to 2200 hours. This rigorous schedule was comparable to the demands of an actual mobilization. The first two days were devoted to the Army Physical Fitness Test (APFT), weapon issue, weapon training, cleaning, zeroing, record firing of the M16 Rifle, and the Common Task Tests. This training and testing was conducted with both MOSs and is listed in Table A2 of Appendix A. It should be noted that the time shown for Common Task Tests is only scheduled time; Drill Sergeants who served as Platoon Sergeants for the four IRR platoons also administered Common Task Tests in evenings and other periods of opportunity each day.

The final three training days focused on the MOS-specific tasks. All MOS tasks trained were Skill Level 1 tasks. The right hand column in Table 1 presents the MOS12B tasks trained and the overall time devoted to each. The training time shown is only the scheduled time and does not take into account road marches, meal time, and makeup training time in the evening for those on sick call who missed the scheduled training period.

MOS-specific training and testing were conducted in the classrooms and outside practical exercise areas. There were up to 30 soldiers in each classroom. The student to instructor ratio was about 6 to 1. Each soldier had the equipment necessary to perform the task during the test period. Inert training aid devices were used for Demolition and Mine training. A detailed description of how the training was conducted with the Combat Engineers is presented in Table A3, Appendix A.

The planned conduct of training for each MOS task was as follows: Before commencing training, instructors called for those who thought they were already proficient on the task to volunteer for testing. Volunteers, if any, were taken to another area for immediate testing. For others, training began with a talk-through demonstration of how to perform each step of the task. This was followed by a short practical exercise, with assistant instructors circulating among the soldiers to coach or prompt when necessary. Testing of individual tasks was conducted simultaneously, with all soldiers in the group working individually under given time limits. During testing, instructors circulated among the soldiers to observe performance, to give additional training to those performing steps incorrectly, and to record amount of training and "Go/NoGo" scores in the soldier's evaluation booklet, as described in the following section.

Task Performance Evaluation Booklets

Task performance evaluation booklets were developed by ARI based on the Engineer School's task evaluation sheets for each task and the Skill Level 1 Soldier's Manual. ARI's objective in designing the evaluation booklet was to obtain data that would serve as a basis for estimating the extent of training given to each individual and the level of proficiency attained. This booklet was issued to each soldier for use by the instructors in recording test performance on each task. Level of training given before the first step was to be recorded as requested (none, little, moderate, or full). If the performance step was scored NoGo and additional training or coaching was given, the instructor was to enter a check mark next to the performance step, followed by the Go/NoGo score obtained on this second attempt. This procedure was to be followed for each additional attempt, if any, to pass the step.

There was one task on each page along with the task performance steps listed for each task in the Soldier's Manual Evaluation Guide. Soldiers presented their booklets to the instructors at each training session for use in recording performance on each step of the task being trained. Booklets were collected by the Drill Sergeants at the end of each training day and were reissued at the beginning of the next day. The booklet was pocket sized (5x7 inches) with spiral binding at the top of the pages and was printed on tear-resistent and moisture-proof synthetic paper.

The CF93 Call-up

Prospective volunteers from the IRR were contacted via mail by the Army Reserve Personnel Center at St. Louis and offered the opportunity to participate in the CF93 training exercise. Prospects were informed that they would participate in an exercise that included training in weapons qualification, common tasks, and MOS tasks. There were no read-ahead packages sent regarding the specifics of the training. The plan was for the IRR volunteers to report to Fort Leonard Wood for a two week period for which they were paid at their paygrade rate. Transportation, billeting, and meals were also included.

Once the identities of the CF93 participants were known, Enlisted Personnel databases were searched by ARI to obtain the following background data on each individual: number of months spent previously on active duty, last paygrade, age, AFQT score, and number of months since release from active duty.

Method

Participants

Combat Engineers. A total of 99 IRR Combat Engineers reported for training during Call Forward 93. However, for the analysis, the sample was limited to the 76 soldiers who participated in all or most of the training and had completed or nearly complete demographic information.

For descriptive purposes, the 76 Combat Engineers separate into two groups, based on length of active duty service. Thirty-eight had only served 3 to 9 months on active duty while receiving their initial entry training (IET) which includes their MOS qualification training. The second group of 38 (prior service) had served at least one full tour of active duty. Table 2 shows the demographic data for the 76 soldiers classified by prior active duty status as "IET-only" (3 to 9 months) and "prior service" (21 to 160 months). The IET-only soldiers are the National Guard and Army Reserve Unit soldiers who entered active duty to obtain their MOS qualification training. The breakouts with fewer than 76 soldiers are due to incomplete demographic information.

Table 2

Demographic Distributions for Combat Engineers

		Paygrade			
Active Duty	(n)	E1-2	E-3	E-4	E-5
IET-only	38	6%	10%	53%	10%
prior service	38	13%	11%	34%	42%

		Age		
Active Duty	(n)	21-25 yr.	26-30 yr.	≥31 yr.
IET-only	38	39%	26%	34%
prior service	35	34%	34%	31%

		AFQT Percentiles		
Active Duty	(n)	<50th	50th-64th	≥65th
IET-only	34	65%	23%	12%
prior service	36	50%	19%	31%

		Time Since Active Duty		
Active Duty	(n)	<4 years	4-8 years	>8 years
IET-only	35	46%	29%	26%
prior service	38	74%	5%	21%

The proportions of soldiers scoring in three AFQT score ranges corresponding to the combined Mental Category I & II (≥65), Mental Category IIIA (50-64), and Mental Category IIIB and below (≤49) are shown in Table 2. Note that a majority of soldiers in the IET-only group score below the AFQT median (50th percentile).

It should be noted that the breakout of time since active duty (Table 2) has different meaning for the IET-only group as compared to the prior service group. Time since active duty for the IET-only group means length of time since completion of their advanced individual training for their MOS. Note that about 55% of the IET-only group completed their MOS training more than four years ago. We were unable to document the MOS duty time in National Guard or Army Reserve Units following award of the MOS. On the other hand, for the prior service group, time out means time since completion of a two year or longer tour of presumably full time on-the-job training and experience following the MOS qualification training. Note that the majority of this group has been out of active duty 4 years or less.

Instruments

School Knowledge Tests. Two equivalent forms of an Advanced Individual Training knowledge test were developed. The equivalent forms were developed from a test originally developed and administered as part of a larger ARI research effort entitled "Improving the Selection, Classification, and Utilization of Army Enlisted Personnel: Project A" (Campbell & Zook, 1991). Under Project A, the test was administered to 840 combat engineers during the period of July 1988 to February 1989. These soldiers, all at Skill Level 1, were nearing the end of their first tour of active duty and had been on active duty from approximately two to three years. The test data obtained from these active duty soldiers can serve as a valid comparison baseline, or reference, of reacquired skill for the IRR soldier completing the rapid train-up.

Equivalent forms were constructed with the aid of an item analysis available from Project A. Equivalent forms were needed to avoid administering the same items before and after training. Items were clustered by subject content. Each content cluster, such as mines, was then divided into two equal sets of items based on percent correct for each item. This resulted in 79 items for each alternate form for the combat-engineers knowledge test.

Identification of Knowledge subtests. Items in the two forms of the school knowledge test were examined for direct relevance to the tasks trained and tested during the Rapid Train-Up. For the Combat Engineers this procedure resulted in identifying 3 subtests, MOS items that were trained during CF93 (33 items), Common Task (CT) items that were trained (25 items), and Non-trained items (100, which include both kinds, but not incorporated in the rapid train-up). The types of items were evenly balanced (plus or minus one item) between forms A and B.

Procedure

The school knowledge test was administered by ARI researchers as a pretest during a two hour session at the end of the inprocessing and prior to transfer of soldiers to the training units (see Figure 1). The form of the knowledge test that each soldier received at the first administration was determined randomly. One-half of the IRR soldiers received Form A while the other half received Form B. Instructors were not involved with the administration of the tests and were not aware of the content of these tests. The two forms of the knowledge test were also administered by ARI researchers at the end of training just prior to transfer of soldiers to the readiness processing unit. Care was taken to ensure that each soldier, at the second administration, received the opposite form to assure counterbalancing.

A team of six researchers from ARI conducted observations of the training and testing of tasks. An observer's checklist was developed and used to assist researchers in conducting their observations. The objective of these observations was to identify tasks that were trained and tested under conditions that would provide a reliable basis for measuring skill reacquisition.

Results

Overview

We will first present findings from the School Knowledge pretest and posttest scores and will then proceed to examine scores as a function of length of active duty (IET-only group vs prior service group), AFQT, and time elapsed since active duty. The extent to which knowledge is reacquired will be examined by comparing the IRR posttest scores to scores from the active duty reference group tested at the end of MOS training and again at the end of the reference group's first active duty tour.

We will next report findings from the hands-on performance tests in terms of indices of quality of performance and of amount of instructor effort required to produce a Go. These indices are examined as a function of length of active duty, AFQT, and time elapsed since active duty.

We will then present findings on the relationship between performance on the MOS items from the knowledge test and performance on the MOS specific hands-on tests. And finally, Drill Sergeants' ratings of level of training required to produce a Go on each of the 12 Common Task Tests are presented.

School Knowledge Tests

Table 3 presents the pretest and posttest means for the MOS items , the CT items, and the Non-trained items. (Throughout, MOS items and CT items are those relevant to the CF93 training. All others are labeled "Not-trained.") The MOS items show a large increase in scores from the pretest to the posttest. Neither the CT items nor the Not-trained items show any increase. Further analyses of the latter two subtests will not be presented.

Table 3

Means for Knowledge Tests Administered Before and After Training of IRR Combat Engineers (n = 76)

Subtests	Mean Percent Correct: Pretest	Posttest	t(75)	p
MOS items	62.2	74.1	6.18	< .001
CT items	56.4	57.5		n.s.
Non-trained items	47.7	47.6		n.s.

Results obtained from multiple regression analyses (Table C1, Appendix C) identify three factors that have strong influence on individual differences in pretraining and posttraining proficiency. These three factors are months on active duty, AFQT scores, and months since release from active duty.

Knowledge Test Score as a Function of Length of Active Duty and AFQT Scores. Figure 2 presents the mean pretest and posttest scores on the MOS items subtest of the School Knowledge Test. A 2 (active duty (AD) status) X 2 (AFQT) X 2 (pretest, posttest) analysis of variance (ANOVA) was performed. The two levels for active duty status were the prior service group versus the IET-only group. The two levels for AFQT were above and below the median (50th percentile). The summary table for this analysis is presented in Appendix C, Table C2.

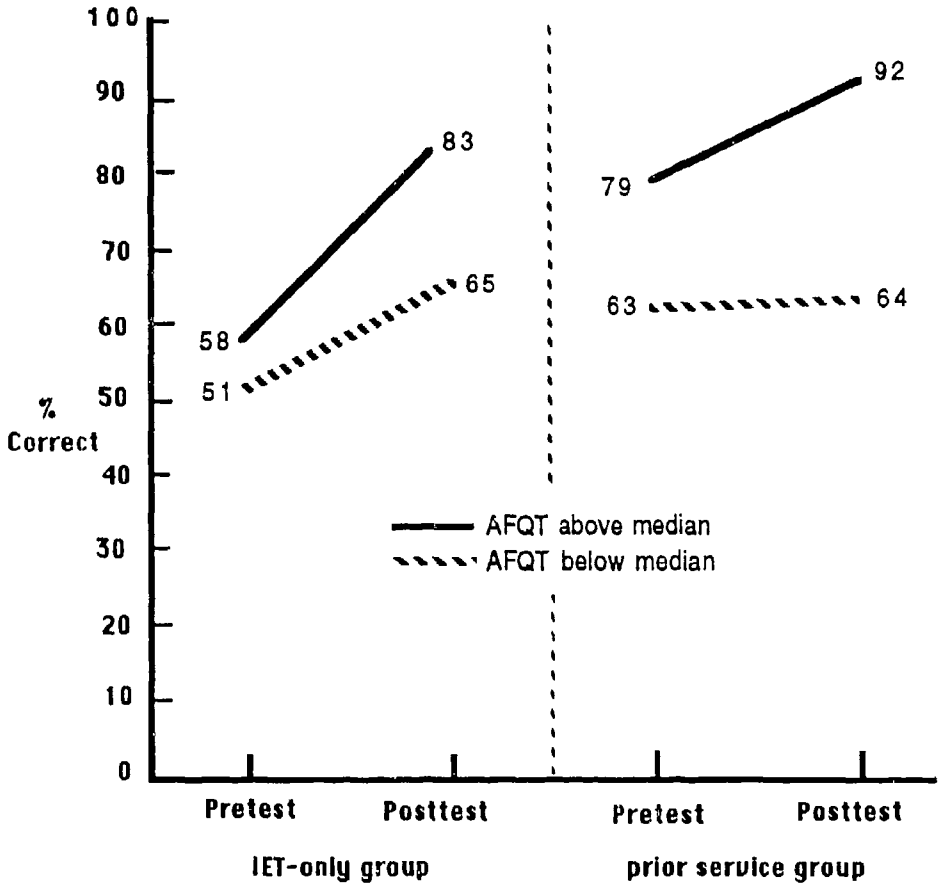

Figure 2. Mean score on MOS items for soldiers above and below the AFQT median in the two groups differing in length of active duty.

Both differences in active duty status and level of AFQT scores are strongly related to performance on the MOS-items subtest (AD status, $F(1, 66) = 13.75$, $p<.001$; AFQT, $F(1, 66) = 36.62$, $p<.0001$). When disregarding AFQT scores, the prior service group's overall performance on MOS items is superior to that of the IET-only group. Bearing this in mind, Figure 3 graphically illustrates the influence of high versus low AFQT. Whether high or low on AFQT, prior-service soldiers brought a higher level of knowledge of specific MOS tasks to CF93 than did those in the IET-only group. However, both high and low AFQT soldiers in the IET-only group acquire or reactivate MOS specific knowledge during the rapid train-up to levels equivalent, respectively, to posttest score levels of the high and low AFQT soldiers in the prior service group.

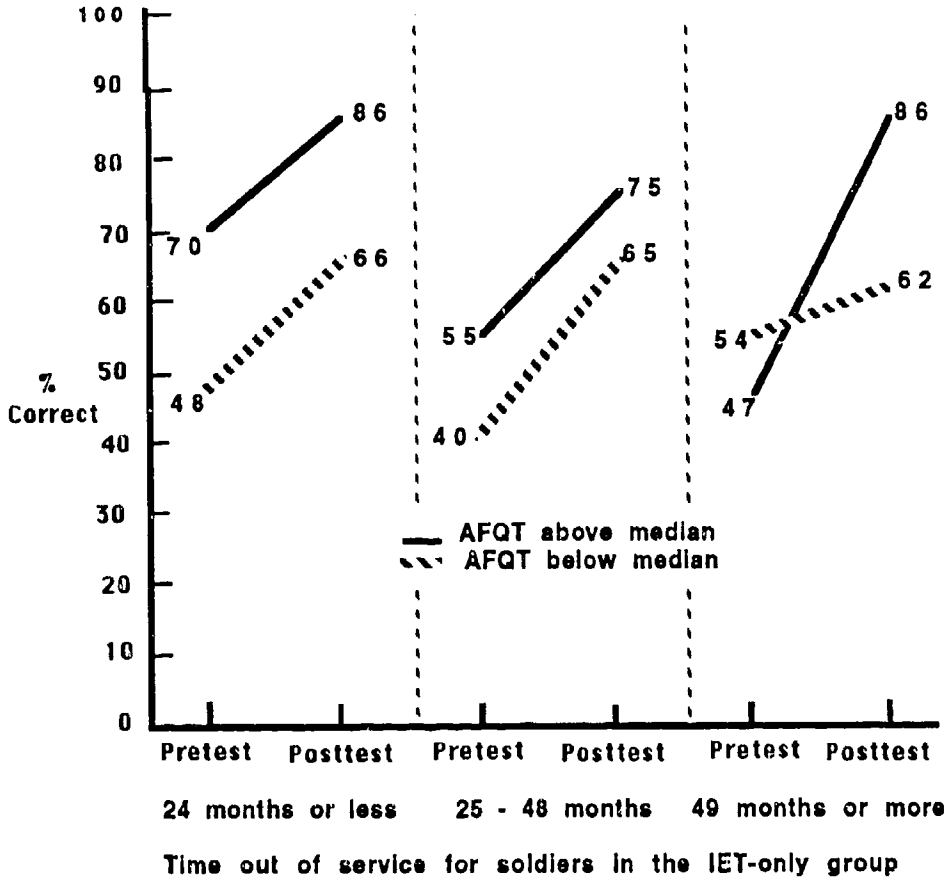

Figure 3. Mean pretest and posttest scores on the MOS items subtest for IET-only soldiers differing in level of AFQT and months since release from active duty.

These same findings are illustrated from a different perspective in Table 4. The conventional cut-off score of 70% was adopted to identify those "proficient" in job knowledge (those scoring 70% correct or greater) and those not yet proficient (with scores below 70%). In Table 4 the two groups differing in lengths of active duty are compared based on the proportion of soldiers in each group who scored above or below this minimum level of proficiency. The prior service group has a higher proportion of soldiers above the 70% level than the IET-only group during pretest. This holds for prior service soldiers at both high and low AFQT levels. However, at posttest the almost all of the high AFQT soldiers of both active duty groups are above the proficiency score level. The low AFQT soldiers from the two active duty groups are similarly distributed above and below the 70% proficiency score.

Table 4

Proficiency Level of Soldiers Classified by Active Duty Status and Level of AFQT Scores

Pretest

	n	Not proficient	Proficient	Chi-Square	p
High AFQT					
IET-only	12	75%	25%		
prior svc	18	22%	78%	8.0(1df)	<.01
Low AFQT					
IET-only	22	91%	9%		
prior svc.	18	56%	44%	6.5(1df)	<.02

Posttest

	n	Not proficient	Proficient	Chi-Square	p
High AFQT					
IET-only	12	17%	83%		
prior svc	18	0%	100%	(inadequate frequencies)	
Low AFQT					
IET-only	22	64%	36%		
prior svc.	18	50%	50%	0.5(1df)	ns

Knowledge Test Scores as a Function of Time Since Active Duty, and AFQT Scores. Figures 3 and 4 present mean pretest and posttest scores on the MOS items subtest for the IET-only and the prior service groups respectively. A 2 (AFQT) X 3 (months out of active duty) ANOVA was performed on the pretest-posttest scores separately for the IET-only group and the prior service group. The summary tables for these two analyses are presented in Appendix C, Tables C3 and C4, respectively. These analyses indicate that months out of active duty had no significant decaying effect on pretest scores and the posttest scores were also not affected. The AFQT scores, as shown in Figures 3 and 4, are strongly related to knowledge test scores across the range of months out of active duty for both the IET-only ($F(1, 25) = 13.20$, $p<.001$) and the prior service soldiers ($F(1, 30) = 15.03$, $p<.001$).

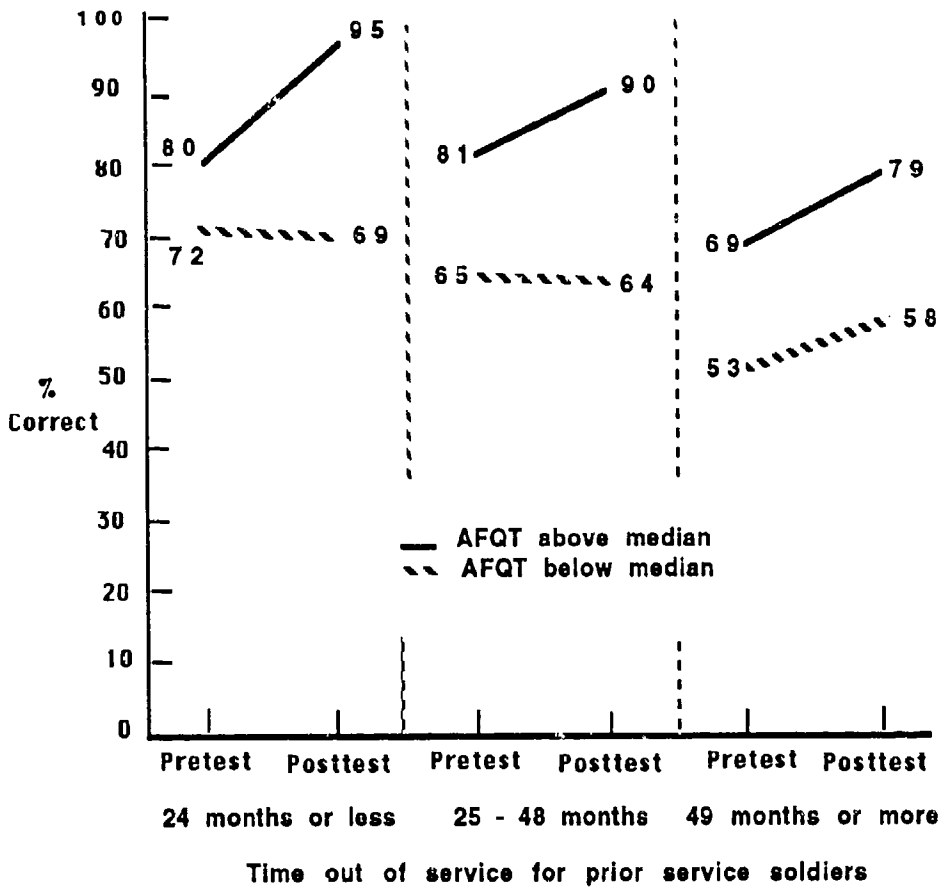

Figure 4. Mean pretest and posttest scores on the MOS items subtest for prior service soldiers differing in level of AFQT and months since release from active duty.

Knowledge Test Scores Compared to Scores of an Active Duty Reference Group. As previously described (Campbell & Zook, 1991), the School Knowledge test items used in this study were administered at an earlier time to 840 Combat Engineers. Of these 840 soldiers, 597 received two administrations of the knowledge test. The first administration was given at the end of their entry level MOS training and the second administration given approximately two to three years later at the end of their first tour of active duty. Thus, for this group of 597 Combat Engineers, we have two sets of scores, end of entry level MOS training and end of first duty tour. Data from these two administrations provide us with an active duty reference group for use in evaluating the level of proficiency attained by IRR soldiers who were on active duty only for entry level MOS training (IET-only) and those who served at least one full tour after entry level MOS training (prior service).

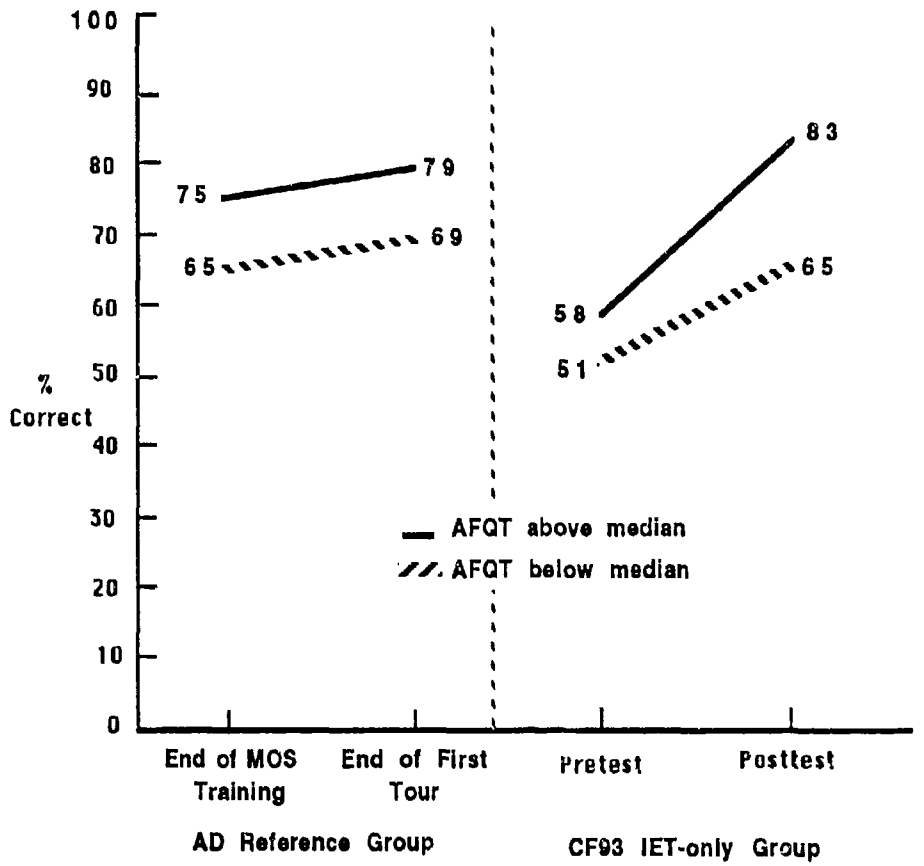

Figure 5. Comparison of MOS items subtest scores for high and low AFQT soldiers in the IET-only group and the active duty reference group.

Figure 5 compares mean percent correct scores of the IET-only group at both pretest and posttest with the mean scores of the active duty reference group at the end of their entry level MOS training and at the end of their first tour. Both groups were subdivided into soldiers scoring above and below the AFQT median. The reference group's end-of-MOS-training scores are used to represent the average score expected of a group at the end of entry level MOS training. As shown, both high and low AFQT soldiers in the IET-only group entered CF93 training well below the level of proficiency expected on the MOS items subtest (low AFQT: $t(21) = 4.77$, $p < .001$; high AFQT: $t(11) = 4.55$, $p < .001$). This comparison of their pretest scores with the end of training scores for the reference group provides an estimate of the extent of decay of MOS knowledge that has occurred in the IET-only group since their MOS training.

Note that at posttest the high AFQT soldiers in the IET-only group had reacquired a level of MOS knowledge (in the areas trained) that is equivalent to the level high AFQT soldiers in the reference group had at the end of their first tour of active duty. On the other hand, the MOS knowledge of the low AFQT, IET-only soldiers improved, but at posttest reached only the level of the low AFQT reference groups scores at the end of initial MOS training. This level is significantly below the end-of-first-tour reference group's mean ($t(22) = 2.32$, $p < .05$).

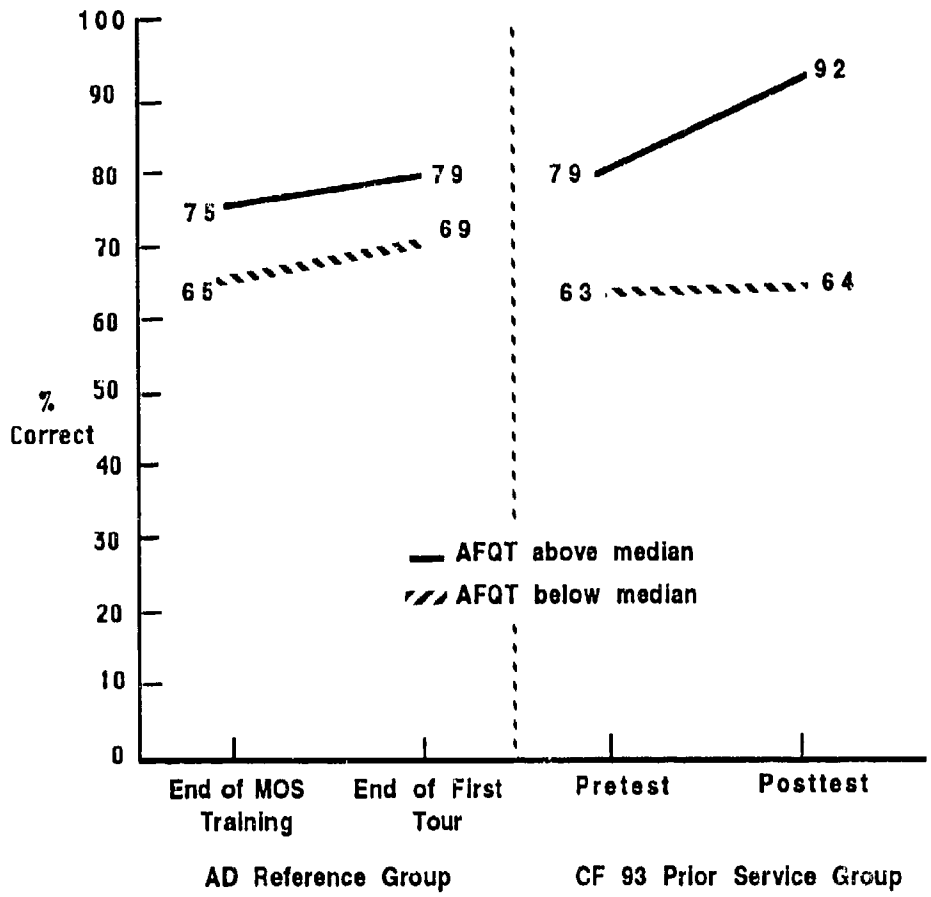

Figure 6. Comparison of MOS items subtest scores for high and low AFQT soldiers in the prior service group and the active duty reference group.

Figure 6 compares the prior service group's scores (pre and post) with the active duty reference group's scores (end of MOS training and end of first tour). Both groups were subdivided into soldiers scoring above and below the AFQT median. The end-of-first-tour scores are used to represent the average knowledge score expected of experienced, skill level 1 Combat Engineers. The high-AFQT soldiers in this prior service group entered the CF93 training with, on average, knowledge scores that are comparable to the means obtained both at the end of MOS training and at the end of first tour by high AFQT soldiers in the reference group. After the rapid train-up, these soldiers have increased significantly their level of knowledge, exceeding the level of the reference group at the end of their first tour ($t(17) = 6.57$, $p<.001$).

Prior service soldiers in the low-AFQT group entered CF93 with approximately the same level of MOS knowledge that the low-AFQT soldiers in the reference group had at the end of initial MOS training. Surprisingly, this low AFQT group shows no increase in MOS-items scores at posttest and remains at the level expected at the end of initial MOS training. This was also the case for the low AFQT soldiers in the IET-only group (Figure 5). However, because of the high

variability of these posttest scores, they are not significantly different from the end of first tour scores for the low-AFQT reference group.

Hands-on Tests

Level of training and Go/NoGo performance data were obtained for each soldier from the individual Soldier Evaluation Booklets. These data were taken from the test records for 14 tasks that tested the individual soldier's performance skill. Six of these tasks were mine warfare tasks consisting of two parts, one part for installing and a second part for removing the given mine. Due to time limitations some individuals were tested on one part but not the other. Because of this missing data, in this analysis each part was counted as a separate task test. As a result, the data obtained were based on 20 task tests shown in Table 5.

Table 5

MOS Tasks Tested for Individual Soldier's Performance Skills

Task	Number of Tests Given
Tie Knots & Lashings	75
Double-Single Bailey Bridge	60
Construct Nonelectric Initiating/Detonating Assly	72
Prime Explosives Nonelectrically	72
Construct Electric Initiating/Detonating Assly	73
Prime Explosives Electrically	66
Prime Explosives with Demo Cord	73
Install a Dual Firing System	71
Install M14 Antipersonnel Mine	68
Remove M14 Antipersonnel Mine	63
Install M16A1 Antipersonnel Mine	71
Remove M16A1 Antipersonnel Mine	70
Install M15 Antitank Mine	39
Remove M15 Antitank Mine	38
Install M19 Antitank Mine	71
Remove M19 Antitank Mine	70
Install M21 Antitank Mine	63
Remove M21 Antitank Mine	63
Install Antihandling Devices on Antitank Mines	38
Remove Antihandling Devices on Antitank Mines	37
Total Number of Tests Scored	1253

At the start of each individual task training and testing session, soldiers were invited to volunteer for testing before receiving training. There were very few volunteers and they generally did not succeed in passing the pretest. As a result, all received essentially the same initial training before being tested. The differences in the overall amount of training soldiers received were produced as a function of the soldier's Go versus NoGo performance on task steps and the instructor's response to the NoGo on steps during testing.

The difference in training between individuals is indexed by the number of task tests containing NoGos and the accompanying checkmarks recorded by the instructor to indicate when additional training was given for that step before a final Go or NoGo was obtained. This method of recording enabled identification of two characteristics of performance on the hands-on tests: quality of performance and amount of instructor effort required to produce a Go.

The quality-of-performance assessment provides a profile of hands-on performance for each soldier based on three frequency counts: number of tasks that were scored Pure Go, Assisted Go, and Final NoGo. A Pure Go on a given task test means that all task steps were performed correctly without further training beyond the initial training everyone received. An Assisted Go means that an error was made on at least one task step and that step was scored NoGo. The instructor then provided further training for the step(s) in the form of prompting or coaching, and the soldier then correctly performed the step(s) and received a Go on the overall task. A Final NoGo means that with or without further training the soldier did not correctly perform the steps required. These three indices were tallied separately for each soldier based on the 20 tasks shown in Table 5. However, because not all soldiers performed all 20 task tests, the frequencies were converted to percent of the number of task tests each soldier was administered.

The second characteristic of hands-on test performance, the relative amount of instructor effort required to produce a Go, is reflected in the amount of prompting (or coaching) expended to produce a Go. Two indexes are used to quantify this characteristic. The first is simply the proportion of tasks trained that required training beyond that given before testing. This is calculated by combining the Assisted Go and the Final NoGo described in the preceding paragraph. Thus, this is simply a mirror image of percent Pure Go and does not require separate analysis. The second index reflects the average "intensity" of instructor effort expended to produce a Go for task tests in which soldiers required prompting to achieve a Go. This index, the average number of prompts for tests prompted, is computed by first adding up the number of prompts given for steps converted from NoGo to Go. In addition, time constraints sometimes prevented instructors from providing prompts to assist a soldier in converting a NoGo to a Go. To take this into account in the index the number of steps scored NoGo that did not receive prompting are also counted to reflect the number of prompts needed as well as the number of prompts given. The total count of prompts for each soldier is then divided by the number of task tests in which that soldier received prompts. This yields the average number of prompts as an index of instructor effort.

Hands-On Tests and Length of Active Duty. Table 6 compares quality of performance indices for soldiers who have served regular tours of active duty (prior service) with those who served only the short tours required for MOS training (IET-only). Mean values and results of t-tests for these indices are shown in the top part of Table 6. Differences between these active duty groups are not statistically significant for any of the three indices.

The lower part of Table 6 compares the two active duty groups on the two indices for amount of instructor effort required to produce Go. The two groups do not differ significantly on either the proportion of tests that received coaching or the average number of prompts per tests in which coaching occurred.

Table 6

Comparison of Soldiers With Differing Lengths of Active Duty Related to Hands-On Performance

Indices of Quality of Performance

	IET only	prior service	t(74)	p
Pure Go	80.5%	84.8%	1.10	ns
Assisted Go	13.2%	12.2%	0.32	ns
Final NoGo	6.4%	3.0%	1.94	ns

Indices of instructional effort required to produce Go

	IET only	prior service	t(74)	p
% tests prompted	19.5%	15.2%	1.10	ns
average number of prompts	2.04	1.83	0.58	ns

Hands-On Tests and AFQT Scores. Tables 7 and 8 compare the performance of high and low AFQT soldiers for the IET-only group and the prior service group, respectively. AFQT is strongly related to hands-on performance for the IET-only group. Low AFQT soldiers in this group have significantly fewer Pure Go, a higher rate of assisted Go and, when they receive coaching during a task test, are likely to require about twice as much prompting on the test as do soldiers in the higher AFQT group.

Table 7

Quality of Performance and Instructional Effort Required to Produce Go for IET-Only Soldiers

Indices of quality of performance

	High AFQT	Low AFQT	t(32)	p
Pure Go	90.2%	75.2%	2.40	<.05
Assisted Go	6.3%	16.4%	2.24	<.05
Final NoGo	3.4%	8.3%	1.47	ns

Indices of instructional effort required to produce Go

	High AFQT	Low AFQT	t(68)	p
% tests prompted	9.8%	24.8%	2.40	<.05
average number of prompts	0.99	2.65	3.33	<.01

As shown in Table 8, AFQT is not significantly related to hands-on performance for the prior service group.

Table 8

Quality of Performance and Instructional Effort Required to Produce Go for Prior Service Soldiers

Indices of quality of performance

	High AFQT	Low AFQT	t(34)	p
Pure Go	86.7%	81.6%	0.91	ns
Assisted Go	9.8%	15.5%	1.21	ns
Final NoGo	3.5%	2.9%	0.29	ns

Indices of instructional effort required to produce Go

	High AFQT	Low AFQT	t(68)	p
% tests prompted	13.3%	18.4%	0.91	ns
average number of prompts	1.47	2.24	1.52	<.005

Hands-On Tests and Time Elapsed Since Active Duty. Six 2 (AFQT) X 3 (months out of active duty) factorial ANOVA were performed on the IET-only and the prior service groups separately, using as the dependent variables percent pure go, percent assisted go, and average number of prompts per tests prompted. Summary tables for these analyses for the IET-only group are in Appendix C, Table C5; the corresponding tables for the prior service group are in Table C6.

Means for performance scores used in the analysis for the IET-only group are presented in Table 9. Across the three time intervals, the differences in performance are not statistically significant for the indices of quality of performance. AFQT, however, is significantly related to percent pure go performance without regard to number of months out of active duty, ($F(1, 25) = 6.10$, $p<.05$). For the IET-only group, AFQT is also significantly related to average number of prompts required to produce Go ($F(1, 25) = 7.83$, $p<.01$). Thus for the IET-only group, AFQT had a greater affect on hands-on performance than did months since active duty.

Table 9

Comparison of Hands-On Test Performance by IET-Only Soldiers Differing in AFQT and Months Since Release From Active Duty

IET-only group

Indices of quality of performance

	Percentage after training		
	Short (<25 mos.)	Medium (25-48 mos.)	Long (>48 mos.)
Pure Go			
High AFQT	97.9%	89.6%	86.6%
Low AFQT	80.8%	83.4%	68.3%
Assisted Go			
High AFQT	2.1%	4.6%	11.5%
Low AFQT	9.2%	9.5%	22.7%
Final NoGo			
High AFQT	0.0%	5.8%	2.0%
Low AFQT	9.9%	7.1%	8.9%

Indices of instructional effort to produce Go

	Average number of prompts		
	Short (<25 mos.)	Medium (25-48 mos.)	Long (>48 mos.)
High AFQT	0.33	0.80	1.83
Low AFQT	2.77	3.24	2.57

Mean hands-on performance scores for the prior service group are presented in Table 10. Results of the three 2 (AFQT) X 3 (months out of active duty) factorial ANOVA (Table C6, Appendix C) indicate that unlike the IET-only group, neither AFQT nor months out of active duty had an effect on any of the performance test indices for prior service soldiers.

Table 10

Comparison of Hands-On Test Performance by Prior Service Soldiers Differing in AFQT and Months Since Release From Active Duty

Prior service group

Indices of quality of performance

	Percentage after training		
	Short (≤25 mos.)	Medium (25-48 mos.)	Long (>48 mos.)
Pure Go			
High AFQT	89.1%	82.7%	86.9%
Low AFQT	83.0%	89.0%	76.9%
Assisted Go			
High AFQT	8.4%	11.1%	13.1%
Low AFQT	16.3%	5.5%	18.9%
Final NoGo			
High AFQT	2.5%	6.2%	0.0%
Low AFQT	0.7%	5.6%	4.3%

Indices of instructional effort required to produce Go

	Average number of prompts		
	Short (≤25 mos.)	Medium (25-48 mos.)	Long (>48 mos.)
High AFQT	1.51	1.35	1.63
Low AFQT	2.17	3.27	1.87

School Knowledge and Hands-On Proficiency

Before rapid train-up, the administration of the School Knowledge test resulted in only 38% of the 76 soldiers obtaining scores at or above the proficiency score (set at 70% correct). Spearman correlations between the School Knowledge tests and the hands-on test performance are presented in Table 11. These correlation indicate that scores on the MOS items during pretest administration did not predict the three quality of performance indices for the hands-on tests nor the two indices of instructional effort required to produce a Go.

However, Spearman correlations in Table 11 for the administration of the test after rapid train-up indicate a significant relationship between quality of performance on the hands-on tests and the scores on the knowledge test. The higher the quality of performance on the hands-on tests, the higher the posttest knowledge score. The correlations of the two indices of instructional effort required to produce a Go with the posttest knowledge scores indicates that those who required little if any instructor coaching to obtain a Go are those who later obtained higher scores on the posttest. Following task training and hands-on testing, 63% of the soldiers scored at or above the proficiency cut (70% correct).

Those who received the most coaching and prompting during hands-on testing are also those who scored below the proficiency level on the knowledge posttest. Percent of tests prompted and average number of prompts given were twice as high for soldiers who subsequently scored below proficiency on MOS items as for soldiers who scored proficient ($t(74) = 3.19$, $p<.005$; $t(74) = 3.84$, $p<.001$). The soldiers who score below proficiency do not appear to have acquired or reactivated closely related knowledges. Otherwise their posttest scores would have been higher, as was the case with those who did well on the hands-on tests (little or no prompting). It appears that this group learned very little during training and testing. Thus, it is questionable whether those who required the most coaching to obtain a Go will be able to obtain a Go at some later time without a repeat of instruction.

Table 11

Correlations of MOS Items in Pretest and Posttest With Hands-On Performance

Indices of quality of performance

	Pretest	Postest	p
Pure Go	.09	.31	<.01
Assisted Go	-.09	-.26	<.05
Final NoGo	-.03	-.17	

Indices of instructional effort

	Pretest	Postest	p
% tests prompted	-.10	-.32	<.005
average number of prompts	-.08	-.29	<.01

Common Task Tests

The twelve common tasks were trained, tested and recorded in the Soldier's Evaluation Booklet by Drill Sergeants from the 98th Division (Training). Unlike the MOS tasks, the evaluation sheet for the common tasks did not identify task steps to be performed in accomplishing a task. Thus, the method of counting Pure Go, Assisted Go, and Final NoGo used with the MOS tasks can not be applied to the common task tests. The Drill Sergeants applied a Go or NoGo evaluation to the task as a whole, and 100% of the soldiers obtained Go on each of the twelve tasks.

The Drill Sergeants followed the level of training rating instructions in the Soldier's Evaluation Booklet. They provided for each common task a summary rating of level of training provided each soldier. These ratings ranged from 0 for no training, to 3 for full training. Average ratings were computed to provide an estimate of the level of training effort required to produce a Go for each task. Rank ordering of these tasks by level of training effort from most to least is shown in Table 12.

Table 12

Average Ratings for Level of Training Required on Common Task Tests

Task Title	Level of Training Rating
Employ an M18A1 Claymore Mine	2.5
Put on and Wear MOPP Gear	2.1
Decontaminate Your Skin and Personal Equipment	2.0
Prevent Shock	1.6
Determine Magnetic Azimuth Using Lensatic Compass	1.6
Evaluate a Casualty	1.6
Put on a Field or Pressure Dressing	1.4
Recognize Friendly and Threat Armored Vehicles and Aircraft	1.3
Use Challenge and Password	1.3
Determine the Grid Coordinates of a Point on a Military Map	1.3
Identify Terrain Features on a Map	1.2
Put on, Wear, Remove & Store M17-Sers. Protective Mask With Hood	0.5

Average level of training ratings were the same for soldiers differing on months of active duty, length of time since release from active duty, or AFQT scores above or below the 50th percentile. These ratings appear to reflect characteristics of the common tasks that influence Drill Sergeants' decisions on the level of training a task will require to produce a Go.

Discussion

The picture that emerges from our research is in conflict with the current mobilization guideline--recalling the IRR based solely on time since separation. Although other factors (physical fitness, discipline) may have some bearing, our analyses indicate that, if the goal is to select the soldiers who will show more rapid reacquisition of their MOS skills, two important factors to be considered are prior service and AFQT score. Time since separation is a distant third factor.

Before discussing these findings in greater detail, we should note that it is crucial not to generalize these results beyond the skill type investigated here, namely step-by-step procedural skills. The results we report should not be assumed to apply directly to all MOS or to different skill types until that has been demonstrated by further research. The effects for other skill types might be different. Also, interpretation of our findings depends upon such factors as how realistic the circumstances of our data collection appear to be, how reproducible our reported effects are, and how representative our samples of soldiers are of the population from which they are drawn. These factors are discussed in turn below.

As for emulating an actual mobilization, the Call Forward 93 training exercise appeared to do just that. Members of the IRR were called away from their jobs, schooling, etc. to be re-accessed into the Army, and trained on the same rapid train-up tasks to the same standards, and by the same instructors, that would be used during a mobilization. The IRR soldiers toiled to as strenuous a daily schedule as would occur during an actual mobilization. Indeed, during CF93 over half of the IRR complained of being treated like a recruit and over half felt that the exhaustive schedule affected their performance. Similar attitudes and concerns were voiced during the IRR call up for Operation Desert Storm (Steinberg, 1991).

The use of the School Knowledge Test results from Project A (Campbell & Zook, 1991) as active duty reference data may need some elaboration. The goal of rapid train-up is to bring a soldier's skills back to a proficient level. Project A's administration of the test to 597 Combat Engineers at the end of their entry level MOS training (72% correct) and again at the end of their first tour of active duty (76% correct) provides us with two level-of-proficiency benchmarks. However, before comparing our IRR sample with the active duty reference group it was necessary to divide both samples into those scoring above and below the AFQT median. This was necessary because AFQT is strongly related to the School Knowledge Test scores and only 43% scored above the AFQT median in our sample compared to 67% of the reference group above the median (which was representative of the active component during Project A administration).

Separation of soldiers into those scoring above and below the AFQT median resulted in the comparisons shown in Figures 5 and 6 between the two active duty groups in our sample and the active duty reference group. The high AFQT groups in our sample matched or exceeded in the posttest the end-of-first-tour knowledge test scores of the high AFQT reference group. In contrast, the knowledge posttest scores attained by the low AFQT soldiers only reach the level that the low AFQT duty reference group scored at the end of MOS training. These data raise the question of

whether the very brief duration of training characteristic of the rapid train-up, can be expected to be effective in raising the level of knowledge proficiency of low AFQT soldiers. Or, is the lower level of knowledge proficiency of low AFQT soldiers likely to improve significantly beyond the level of the end of entry level MOS training if mobilized for longer periods of training?

The sensitivity of the School Knowledge Test is supported by the fact that performance on the not-trained subtest during CF93 does not differ before and after the rapid train-up (48% versus 48%, from Table 3). Thus, there was no practice effect of taking the knowledge test a second time, probably because of the counterbalancing of test forms. Furthermore, this indicates that soldiers learned only what was trained, and there was no apparent effect, at least not on average, of incidentally reacquiring knowledge related to other MOS tasks. Otherwise there would have been some increase on this subtest after CF93 training. Taken together, these results indicate that the rapid train-up is focused training and that its effectiveness in bringing back a level of knowledge comparable to a job-experienced, active duty, skill level 1 soldier is dependent on high AFQT soldiers.

The measures from hands-on skill testing show a similar but less variable pattern. An overall "Go" rate of 94% (IET-only) to 97% (prior service) was achieved immediately following the rapid training (Table 6). This, however, needs to be interpreted with a bit of caution. These rates are achieved only after varying amounts of prompting by instructors during testing that enables them to convert a NoGo on a step(s) to a Go.

Quality of performance on the hands-on tests is more clearly conveyed by the Pure Go rate of 80.5% (IET-only) and 84.8% (prior service) (Table 6). Pure Go scores occur when the soldier performs all steps correctly without any intervention by the instructor during the test. Low AFQT soldiers had lower pure Go rates (75%) than high AFQT soldiers (90%) but only when they were members of the IET-only group (Table 7). This may reflect a lack of on-the-job experience with these tasks beyond the initial entry level MOS training. However, if this is the case, it does not appear to affect the high AFQT members of the IET-only group. The main point here is that as pure Go rate goes down, the instructor must increasingly intervene in order to produce a Go. The soldier, in spite of having just completed the training portion, requires prompting or coaching on an increasingly larger proportion of the tasks tested, with an increasing number of instructor prompts when prompting is required. As a result, when lots of prompting is required to produce a Go, this may construct a temporary condition in which the soldier is relying on the instructor and has not developed a plan or understanding of what must be done. Under these conditions it is unlikely that the soldier will be able to perform the task at some later time without assistance. Thus, obtaining a Go under rapid train-up conditions is not a sufficient indicator for a genuine reacquisition of the skill.

Conclusions

The finding of perhaps greatest interest is the fact that time out of active duty (RT time) was the least important fact and did not have a significant effect on knowledge pretest scores or response to training shown by both knowledge scores and hands-on tests. Related findings are that prior service IRR soldiers entered the mobilization exercise at a higher level of knowledge proficiency than the group who had been on active duty for only entry level MOS training. However, based on knowledge posttest scores and Pure Go hands-on test scores, the rapid train-up was most effective for soldiers from both groups who had AFQT scores above the median (50th percentile).

In summary, this research questions the validity of recalling the IRR in temporal increments of RT12, RT18, etc. At least from a standpoint of skill reacquisition, it is better to consider first whether an individual completed a tour of active duty, then consider AFQT, and finally consider how long the individual has been separated. Those without a full tour of active duty tour will probably need additional training beyond what is allocated for rapid train-up, and might be candidates for the longer train-up period as described in TRADOC (1992) or for cross training to a shortage MOS. To optimize the assignment and scheduling of IRR assets, a new indicator is needed by the mobilization community--one that considers these factors in a systematic way.

Finally, caution should be taken not to generalize these results beyond the procedural type skills investigated here. Other skill categories need to be examined under similar conditions for a more complete understanding of skill reacquisition by the IRR.

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Appendix A

Conduct of Rapid Train-Up for IRR Combat Engineers

TABLE A1

Rapid Train Up Program of Instruction for Combat Engineer, 12B, Skill Level1 Tasks

Task Title	RTU POI Hours	CF 93 Scheduled Hr.
Tie Knots and Lashings	3.0	3.0
Prepare a Simple Tackle System, and	1.5	1.5
Use/maintain Rigging Equip.		Not trained
Install Pickets, Barbed Wire Ties & Install Concertina	1.0	1.5
Assist in the Assembly of M4T6 Fixed Span	1.5	Not trained
Assist in Assembly of Double-Single Bailey Bridge	1.5	4.0
Assist in Installation of M4T6 Saddle Assy.	1.5	Not trained
Assist in Operation of Pneum. Assualt Boat	1.5	Not trained
Assist Installat. of Overhead Anchorage Sys. Comp.	1.0	Not trained
Perform Operator/Crew Preventive Maintenance Checks & Svc.	2.2	4.0
Drive a Wheel Veh. Cross Country	3.3	Not trained
Operate Blackout Controls/Drive Using Blackout Drive		Not trained
Start a Wheel Veh. engine using Auxiliary Power		Not trained
Recover a Wheeled Vehicle		Not trained
Construct a Nonelectric Initiating/Detonating Assy.,and Prime Explosives Nonelectrically	1.0	5.0
Construct an Electric Initiating/Detonating Assy., and Prime Explosives Electrically	1.0	
Prime Explosives with Demo Cord	1.0	
Install a Dual Firing System	1.0	
Use/Maintain Demolition Equip.	1.0	Not trained
Install/Remove M14 Antipers. Mine	0.2	7.0
Install/Remove M16A1 Antipers. Mine	1.5	
Install/Remove M15 Antitank Mine	1.5	
Install/Remove M19 Antitank Mine	0.5	
Install/Remove M21 Antitank Mine	1.3	
Install/Remove U.S. Antihandling Devices on Antitank Mines	1.0	
Locate Mines Using the AN/PSS-11 Mine Detector	1.0	
Operate the Mine Clearing Line Charge (MICLIC)	1.0	Not trained
Locate Mines by Visual Means, and	0.5	Not trained
Locate Mines by Probing		Not trained
Engineer Hand Tools	Not in POI	1.0
Total, 12B, Skill Level1 Specific Tasks	31.5	27.0

Table A2

Common Tasks Trained During the CF93 Rapid Train Up

Task Number	Title
	Common Tasks (both MOS):
878-920-1002	Recognize Friendly & Threat Armored Vehicles & Aircraft
031-503-1004	Put On, Wear, Remove, & Store M17-Series Protective Mask with Hood
071-329-1001	Identify Terrain Features on a Map
031-503-1015	Put On and Wear MOPP Gear
081-831-1005	Prevent Shock
071-329-1003	Determine a Magnetic Azimuth Using a Lensatic Compass
071-325-4425	Employ a M18A1 Claymore Mine
071-331-0801	Use Challenge & Password
081-831-1000	Evaluate a Casualty
081-831-1016	Put on a Field or Pressure Dressing
071-329-1002	Determine the Grid Coordinates of a Point on a Military Map
031-503-1007	Decontaminate Your Skin and Personal Equipment
Scheduled Time, Common Tasks	8.0 hr.
Other Tasks (both MOS)	
Army Physical Fitness Test	3.0 hr.
M16 Rifle Qualification	8.0 hr.

Table A3

Conduct of Rapid Trainup for IRR Combat Engineers (MOS 12B10)

Task	Instructors	Pretest Volunteers	Training Prior to Testing	Testing	Number Tested	% Go
Tie 8 knots	2 classrooms 1 PI & 7-8 AI per classroom	1 soldier Scored Go	Walk-through demonstration & 7 minute PE/knot for total of 1 hr.	Individual work stations, all tested at *same* time. Allowed 2 min. per knot - Overall time of 45 min.	88	98%
2 Lashings	Same as for knots	1 soldier Scored NoGo	Walk-through demonstration & PE; overall time approx. 20 min.	Testing as for knots Overall time approx. 10 min.	64	97%
Tackle system	Same as for knots	none	Walk-through demonstration & PE Overall time, 30 min. Shortage of tackle equipment-soldiers worked in pairs during training.	Formed into 2 orders Tested 1 order at a time First both orders on single block then repeat on double block. Soldier had 5 min. time limit for each system. Overall time, 30 min.	69	100%
Wire ties (post & apron ties)	3 outdoor tng sites, 1 PI & 4-5 AI each site	1 soldier Partial Go	Walk-through demonstration & PE on individual pickets, overall training & PE time, 15 min.	Each soldier at a picket, given up to 2 minutes for each tie. Overall time approx. 12 min.	59	100%
Concertina Wire	1 outdoor tng area. 1 PI & 13 AI	none - crew task	How-to description given to full group in bleachers. Time 10 min. Divided into 3 groups for PE of approx. 35 min.	Crew task, individual testing was not possible		

Table A3, (Continued)

Conduct of Rapid Trainup for IRR Combat Engineers (MOS12B10)

Task	Instructors	Pretest Volunteers	Training Prior to Testing	Testing	Number Tested	% Go
DS Bailey Bridge	2 outdoor tng sites, 1 PI & 6 AI each site	none - crew task	Description of layout and drill on identification of components & where they go, 30 min. PE on measuring & assembling site layout, 1 & 1/2 hr.	3 testing stations at each site. Soldiers tested individually by instructor using previously prepared set of questions. Overall 1 hr., approx. 4-5 min/soldier.	69	100%
PMCS	2 classrooms, 1 Instructor each	none	2 hr. lecture	soldiers tested in groups of 7, no individual testing		
Demolitions	2 classrooms 1 PI & 4-5 AI per classroom	6 soldiers All partial Go	Walk-through demonstration & concurrent PE on each task in succession; time for each ranging from 20 to 50 minutes. Overall tng time, 3 hr.	3 classrooms used for testing. One soldier/table with 21 tables/room. Soldiers rotated through the rooms with different test in each. Time allowed/test: Electric firing system-10 min Nonelectric firing system-5 min Dual firing system - 5 min. Overall testing time, 2 hr.	81	98%
Install mines Remove mines	3 classrooms 1 PI & 5 AI per classroom	4 on M14 1 Go 3 on M16A1 None Go	Demonstration for install/remove each mine followed by PE- overall tng & PE time, each mine 30-45 min.	Testing for each mine followed immediately after the PE for that mine. Testing time was limited to 10 min. All soldiers tested simultaneously	81	93%

Appendix B

CALL FORWARD 93 Rapid Train-Up of MOS 51B

CALL FORWARD 93 Rapid Train Up of the IRR Carpentry and Masonry Specialists (MOS 51B10)

CALL FORWARD 93

The Rapid Train Up Program of Instruction (POI)

The RTUP POI for the Carpentry and Masonry Specialists contains the 22 tasks listed in Table B1. All but two of these were included as tasks to be trained in CF93 as shown in the last column of Table B1. It should be noted, however, that the first eight tasks listed in the table are construction tasks (e.g., "Construct a floor system," "Construct a frame wall") which, within the CF93 time constraints, could only be partially trained.

Conduct of CF93 Rapid Train Up

The 27 Carpentry and Masonry Specialists formed one platoon in Company B, 3rd Battalion, 391st Regiment, Training Support Brigade, 98th Division (Training).

With the exception of the eight MOS 51B specific tasks, these soldiers trained with the Combat Engineers on the same schedule. On the third and fourth training day, the 51B soldiers were trained separately from the combat engineers on the eight MOS specific construction tasks listed in Table B1. On the fifth and last day of training they rejoined the Combat Engineers for demolitions and mine warfare training/testing.

METHOD

Participants

A total of 27 Carpentry and Masonry Specialists reported for training. Six soldiers did not receive hands-on tests for demolitions and mines. In addition, 1 soldier completed less than 25% of the demolition and mine tests. As a result these 7 are not included in the data reported for this MOS. The available demographic data on the remaining 20 participants are summarized in Table B2.

Table B1

Rapid Train Up Program of Instruction for Carpentry/Masonry Specialist, 51B, Skill Level 1

Task Title	RTU POI Hours	CF 93 Scheduled Hr.
Construct a Floor System	2.0	2.0
Construct a Frame Wall	2.0	2.0
Install Door and Windows	2.0	2.0
Construct Stairs	2.0	2.0
Construct a Roof System	2.0	2.0
Construct a Foundation	4.0	4.0
Construct a Concrete Wall	3.0	3.0
Construct a Masonry Wall	3.0	3.0
Construct a Nonelectric Initiating/Detonating Assy.	0.8	
Prime Explosives Nonelectrically	0.8	
Construct an Electric Initiating/Detonating Assy.	0.8	5.0
Prime Explosives Electrically	1.0	
Prime Explosives with Demo Cord	1.0	
Install a Dual Firing System	0.8	
Clear Misfires	0.8	Not Trained
I/R M14 Antipers. Mine	0.8	
I/R M16A1 Antipers. Mine	0.8	
I/R M15 Antitank Mine	0.8	
I/R M19 Antitank Mine	0.8	7.0
I/R M21 Antitank Mine	0.8	
I/R U.S. Antihandling Devices on Antitank Mines	0.7	
Locate Mines Using the AN/PSS-11 Mine Detector	0.7	
Neutralize Mines	0.6	Not Trained
Total, 51B, Skill Level 1 Specific Tasks	32.0	32.0

Table B2 shows that approximately one-half of these volunteers were National Guard or Army Reservists who had served less than a full two-year tour of active duty. They entered active duty to obtain their MOS qualification. This group is identified as the Initial Entry Training (IET-only) group. The majority of the IET-only volunteers can be characterized as follows: rank was Private (E1-2), age was spread rather evenly from 21 to 30 years, AFQT score was at or below the median, and time since active duty was 4 years or less. Compared to these IET-only volunteers, those who had been on active duty from 2 to 11 years (designated the "prior service" group) held higher ranks and were older. However, a majority of these soldiers also scored at or below the AFQT median score. They were almost evenly split between having been out of active duty four years or less versus having been out eight years or more.

Table B2

Demographic Distributions for the Carpentry and Masonry Specialists

		Paygrade			
Active Duty	(n)	E1-2	E-3	E-4	E-5
IET-only	10	70%	0%	20%	10%
prior service	10	0%	20%	50%	30%

		Age		
Active Duty	(n)	21-25 yr.	26-30 yr	≥31 yr.
IET-only	10	40%	40%	20%
prior service	10	20%	30%	50%

		AFQT Percentiles		
Active Duty	(n)	≤50th	50th-69th	≥70th
IET-only	10	70%	20%	10%
prior service	9	67%	33%	0%

		Time Since Active Duty		
Active Duty	(n)	≤4 years	4-8 years	≥8 years
IET-only	10	70%	20%	10%
prior service	9	44%	11%	44%

Instruments

School Knowledge Tests. Two equivalent test forms were developed from an MOS 51B Advanced Individual Training knowledge test containing 154 items. Development of these forms followed the same procedures described in the main body of this report for the combat engineers. This resulted in 81 items for each form for MOS 51B.

Identification of Knowledge Subtests. Items in the two forms of the school knowledge test were examined for direct relevance to the tasks trained and tested during the Rapid Train Up. For the Carpentry and Masonry Specialists this procedure resulted in identifying four types of knowledges tested to form four subtests. These are: MOS items trained (63 items), Common Task (CT) items trained (16 items), Basic Carpentry (BC) items not trained (42 items), and General Soldiering (GS) items not trained (29 items).

RESULTS

Table B-3

Means for School Knowledge Tests Administered Before and After Rapid Train Up of Carpentry and Masonry Specialists (N-20)

Subtests	Pretest	Posttest
MOS items trained	54.7	63.5
CT items trained	58.4	65.1
BC items not trained	63.9	57.9
GS items not trained	61.7	60.6

Table B-4

Mean Posttest Scores for IRR Carpentry and Masonry Specialists Compared with Mean Scores for the Active Duty Reference Group

Subtests	IRR Posttest Means	AD Reference Group
MOS items trained	63.5	57.6
CT items trained	65.1	65.1
BC items not trained	57.9	62.0
GS items not trained	60.6	69.0

Knowledge Test Scores and Months of Active Duty

Table B-5

Mean Scores on Knowledge Subtests for IRR Soldiers with and without Full Tours of Active Duty

	School Knowledge Scores (% Correct)	
Pretest	IET-only(n=10)	Prior Service (n=10)
MOS items trained	51.2	58.2
CT items trained	60.4	56.3
BC items not trained	56.6	71.2
GS items not trained	60.9	62.6
Posttest		
MOS items trained	62.9	64.1
CT items trained	66.8	63.3
BC items not trained	56.9	58.8
GS items not trained	60.0	61.3

Table B-6

Percent of Soldiers Who Score Above or Below 70% Proficiency Level on Subtest for MOS Items Trained

Pretest	n	Percent of Soldiers
not proficient	17	85%
proficient	3	15%
Posttest		
not proficient	12	60%
proficient	8	40%

Knowledge Test Scores and AFQT Scores

Table B-7

Mean Scores on School Knowledge Subtests for IRR Soldiers with Scores Above or Below the 50th Percentile on the AFQT

Pretest	Below (n=13)	Above (n=6)
MOS items trained	48.4	65.2
CT items trained	50.1	73.1
BC items not trained	55.8	73.2
GS items not trained	60.4	70.0
Posttest		
MOS items trained	60.0	73.0
CT items trained	56.8	78.7
BC items not trained	54.5	73.9
GS items not trained	54.5	65.2

Knowledge Test Scores and Time Elapsed Since Active Duty

Table B-8

Mean Scores on School Knowledge Subtests for IRR Soldiers Out of Active Duty for Less Than or More Than 4 Years

Pretest	≤4 years (n=11)	>4 years(n=8)
MOS items trained	59.9	50.7
CT items trained	65.6	50.8
BC items not trained	64.8	61.4
GS items not trained	64.0	66.4
Posttest		
MOS items trained	67.6	58.5
CT items trained	71.9	58.2
BC items not trained	62.0	50.5
GS items not trained	63.0	60.3

Appendix C

Summary of Tables for Multiple Regression and ANOVA

Table C1

Summary Table for Stepwise Multiple Regression Analysis (N=67)[1] : Significant Effects for each Dependent Variable (Subtest)

Subtest	Significant Effects (p<.01) (strongest predictor 1st)	% of variance in subtest scores accounted for by all significant effects combined
Pretest		
MOS-items/trained	MoAD, AFQT	44%
CT-items/trained	AFQT, MoAD	41%
Untrained	MoAD, AFQT	43%
Posttest		
MOS-items/trained	AFQT, MoOUT	44%
CT-items/trained	AFQT, (MoAD)[2]	35%
Untrained	AFQT, MoAD, (MoOUT)	38%

[1] AFQT scores and/or months out of active duty were missing for 9 soldiers.

[2] The parentheses indicate significance only at the .05 level.

Legend
MoAD - months of active duty
MoOUT - months out of active duty
AFQT - Armed Forces Qualification Test

Table C2

Summary Table for Analysis of Variance of Knowledge Test Scores with Active Duty Status (AD Status), and AFQT Across Pretraining and Posttraining Administration of the MOS Items/trained Subtest.

Source of variation	df	mean square	F value	p
Between subjects	69			
AD Status	1	.3736	13.75	<.0004
AFQT	1	9954	36.62	<.0001
MoAD X AFQT	1	.0659	2.43	n. s.
Subj. w. groups	66	.0271		
Within subjects	70			
PrePost	1	.5479	45.46	<.0001
PrePost X AD Status	1	.1387	11.51	<.0012
PrePost X AFQT	1	.1043	8.66	<.0045
PrePost X AD Status X AFQT	1	.0004	0.04	n. s.
PrePost X Subj. w. groups	66	.0121		

Legend
AD Status - IET-only group vs prior service group
AFQT - Armed Forces Qualification Test
MoAD - months of active duty
PrePost - Knowledge Pretest vs Posttest

Table C3

Summary Table for Analysis of Variance of Knowledge Test Scores for the IET-Only Group

Source of variation	df	mean square	F value	p
Between subjects	30			
AFQT	1	.2389	13.20	<.0013
MoOUT	2	.0274	1.52	n.s.
AFQT X MoOUT	2	.0136	0.75	n.s.
Error	25	.0181		
Within subects	31			
PrePost	1	.5529	54.26	<.0001
PrePost X AFQT	1	.0189	1.86	n.s.
PrePost X MoOUT	2	.0046	0.46	n.s.
PrePost X AFQT X MoOUT	2	.0459	4.51	<.0213
Error	25	.0101		

Legend
AFQT - Armed Forces Qualification Test
MoOUT - months out of active duty
PrePost - Knowledge Pretest vs Posttest

Table C4

Summary Table for Analysis of Variance of Knowledge Test Scores for the Prior Service Group

Source of variation	df	mean square	F value	p
Between subjects	35			
AFQT	1	.4723	15.03	<.0005
MoOUT	2	.0947	3.02	n.s.
AFQT X MoOUT	2	.0029	0.09	n.s.
Error	30	.0314		
Within subects	36			
PrePost	1	.0419	3.00	n.s.
PrePost X AFQT	1	.0390	2.79	n.s.
PrePost X MoOUT	2	.0008	0.06	n.s.
PrePost X AFQT X MoOUT	2	.0050	0.36	n.s.
Error	30	.0139		

Legend
AFQT - Armed Forces Qualification Test
MoOUT - months out of active duty
PrePost - Knowledge Pretest vs Posttest

Table C5

Summary Table for Analysis of Variance of Hands-On Performance Test Scores for the IET-Only Group

1. Dependent variable: Percent Pure Go:

Source of variation	df	mean square	F value	p
AFQT	1	.1993	6.10	.0207
MoOUT	2	.1035	1.58	ns
AFQT X MoOUT	2	.0141	0.43	ns
Error	25	.0326		

2. Dependent variable: Percent Assisted Go:

Source of variation	df	mean square	F value	p
AFQT	1	.1309	6.64	<.016
MoOUT	2	.0575	2.92	ns
AFQT X MoOUT	2	.0068	0.35	
Error	25	.0197		

3. Dependent variable: Average number of prompts/tests prompted:

Source of variation	df	mean square	F value	p
AFQT	1	16.7994	7.83	<.009
MoOUT	2	1.3167	0.61	ns
AFQT X MoOUT	2	4.2586	1.99	ns
Error	25	2.1446		

Legend
AFQT - Armed Forces Qualification Test
MoOUT - months out of active duty

Table C6

Summary Table for Analysis of Variance of Hands-On Performance Test Scores for the Prior Service Group

1. Dependent variable: Percent Pure Go:

Source of variation	df	mean square	F value	p
AFQT	1	.0101	0.35	ns
MoOUT	2	.0065	0.22	ns
AFQT X MoOUT	2	.0168	0.58	ns
Error	25	.0290		

2. Dependent variable: Percent Assisted Go:

Source of variation	df	mean square	F value	p
AFQT	1	.0069	0.29	ns
MoOUT	2	.0104	0.44	ns
AFQT X MoOUT	2	.0153	0.64	
Error	25	.0238		

3. Dependent variable: Average number of prompts/tests prompted:

Source of variation	df	mean square	F value	p
AFQT	1	5.8303	2.39	ns
MoOUT	2	0.7469	0.31	ns
AFQT X MoOUT	2	1.4951	0.61	ns
Error	25	2.4357		

Legend
AFQT - Armed Forces Qualification Test
MoOUT - months out of active duty